



CLAIMS

What is claimed is:

- (1) A system for pinpointing the precise three-dimensional location and identification of single or multiple, moving or stationary objects in a predefined area, comprising: a transmitter and antenna within or attached to each object, and two or more pairs of receiving antennas dispersed around the perimeter of the predefined area.
- (2) The implementation of a system as claimed in (1), through the use of the following elements:
 - (a) Four or more antennas, arranged in two or more closely spaced pairs dispersed in or around the area to be covered;
 - (b) Downconvertors or receivers attached to each of the antennas, with the local oscillators of the downconvertors in all the receivers derived from a single reference;
 - (c) Phase locked loops to stabilize and reject noise in the downconverted signals;
 - (d) Phase detectors to determine the phase difference between the received signal in each pair of antennas;
 - (e) Phase detectors to determine the phase difference between the received signal in antennas not in the same pair.
- (3) In the system according to claim 1, wherein phase comparison between the down-converted signals from each pair of receiving antennas, to establish a rough location, phase comparison between the down-converted signals ^{from} ~~elements selected from different pairs,~~ to precisely resolve the location.
- (4) In the system according to claim 1, wherein a variable frequency local oscillator is utilized to enable selective reception of signals emanating from individual objects.
- (5) In the system according to claim 1, wherein additional receivers in each object are capable of being enabled and disabled by an object transmitter, and further wherein object transmitter frequency is assignable and an alarm signal is capable of being transmitted to the object being tracked.

- (6) In the system according to claim 1, further comprising computing algorithms or circuitry to automatically detect hazardous proximity of objects or hazardous rate of approach of objects and to automatically transmit alarm signals.
- (7) The system according to claim 1, further comprising surveillance and tracking devices for precise location and identification of single or multiple moving or stationary aircraft and service vehicles.
- (8) The system according to claim 1, capable of pinpointing and identifying each child in real time at one of a day care, school, mall and play ground area.
- (9) The system according to claim 1, capable of pinpointing and identifying each prisoner in real time at one of a prison, work detail off site, jail and penitentiary.
- (10) The application of the system according to claim 1, capable of pinpointing and identifying pets in real time in at least ~~on~~ of homes, apartments or any living quarters.
- (11) The application of the system according to claim 1, capable pinpointing and identifying livestock or animals in a zoo or preserve or national park.
- (12) The application of the system according to claim 1, for aiding and training in officiating of any sporting events.
- (13) The application of the system according to claim 1 for generation of statistics in sporting events.
- (14) The application of the system according to claim 1, capable of pinpointing and accurately determining yardage of first downs in a football game.
- (15) The application of the system according to claim 1 for enhancing playing of sporting events.

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- (16) The application of the system according to claim 1 for enhancing officiating of sporting events.
- (17) The application of the system according to claim 1 for enhancing spectator enjoyment of sporting events
- (18) The application of the system according to claim 1 for enhancing television viewer enjoyment of sporting events
- (19) The application of the system according to claim 1 for monitoring of subjects or objects in any area with defined boundaries.
- (20) The system according to claim 1 for enhancing playing, officiating, statistics generation, spectator enjoyment, or television viewer enjoyment of all sporting events contested at Olympics.
- (21) The system defined according to claim 1, further comprising a map-like interactive display or overlay to point and click at objects to selectively disable or enable the objects, change frequencies, or send alarm signals.
- (22) The system according to claim 1 which will alert the control tower or generate automatic alert signals in the plane if an aircraft enters the wrong runway.